

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 88TY1368	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/IB2005/000149	International filing date (day/month/year) 21.01.2005	Priority date (day/month/year) 28.01.2004	
International Patent Classification (IPC) or national classification and IPC INV. B60K31/00 B60R21/01			
<p>Applicant TOYOTA JIDOSHA KABUSHIKI KAISHA et al.</p>			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <ul style="list-style-type: none"> a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 5 sheets, as follows: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 			
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input checked="" type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application 			
Date of submission of the demand 20.07.2005	Date of completion of this report 04.05.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office - Gitschner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized officer Tamme, H-M Telephone No. +49 30 25901-542		



**INTERNATIONAL PRELIMINARY REPORT
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International application No.
PCT/IB2005/000149

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
 - the international application in the language in which it was filed
 - a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3(a) and 23.1(b))
 - publication of the international application (under Rule 12.4(a))
 - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-19 as originally filed

Claims, Numbers

2-15 received on 12.09.2005 with letter of 01.09.2005
1 received on 08.03.2006 with letter of 08.03.2006

Drawings, Sheets

1/6-6/6 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	2-4, 6-14
	No:	Claims	1, 5, 15
Inventive step (IS)	Yes:	Claims	2, 6-14
	No:	Claims	1, 3-5, 15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Independant claim 1:

D2 discloses a running support system for a vehicle, which includes first object detecting means (1) for detecting an object near a vehicle using a radar; second object detecting means (18) for detecting an object near the vehicle by performing image recognition based on an obtained image of an area near the vehicle; and running support means (ECU) for supporting running of the vehicle, wherein a control condition for running support control performed by the running support means is changed based on only the first object detecting means (1) or both the first object detecting means (1) and the second object detecting means (18).

Thus, this particular "or"-combination of claim 1 is already known from D1. Therefore, the subject-matter of claim 1 is not new and not inventive.

2 Dependant claim 2:

The subject-matter of claim 2 differs from D2 in that a starting condition for the running support control performed by the running support means is shifted to a suppression side in the order of (i) a case where an object has been detected by only the first object detecting means (21), and (ii) a case where an object has been detected by only the second object detecting means (22), as compared to a case where an object has been detected by both the first object detecting means.

Consequently, the subject-matter of claim 2 in combination is new.

The problem to be solved may be regarded as providing more appropriate control.

Although it is known from D2 to change a control condition of running support means

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based on only the first object detecting means or both the first object detecting means and the second object detecting means, second object detecting means being used to evaluate the viability of a possible avoidance path, the order of shift of a starting condition is without example in the available prior art.

Therefore, the subject-matter of claim 2 in combination involves an inventive step.

3 Dependant claim 3:

The subject-matter of claim 3 differs from D2 in further including inattentive condition detecting means (28) for detecting whether a driver is performing inattentive driving, wherein a control condition for running support control performed by the running support means is changed also based on an inattentive condition of the driver detected by the inattentive condition detecting means (28).

Thus, the subject-matter of claim 3 in combination with claim 1 is new.

However, D4 discloses inattentive condition detecting means (S1) for detecting whether a driver is performing inattentive driving, wherein a control condition for running support control performed by the running support means is changed based on an inattentive condition of the driver detected by the inattentive condition detecting means (S1) in order to increase traffic safety.

Therefore, it would be obvious for a skilled person to apply the teaching of D4 for the same purpose in a running support system of D2 and to arrive at a system according to claim 3.

Consequently, the subject-matter of claim 3 in combination is not inventive.

4 Dependant claim 4:

The subject-matter of claim 4 differs from D2 in that, when the same obstacle has been detected by both the first object detecting means (21) and the second object

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detecting means (22), and the inattentive condition detecting means (28) has determined that the driver is performing inattentive driving, a starting condition for the running support control performed by the running support means is shifted to a promotion side, as compared to a case where the driver is not performing inattentive driving.

Thus, the subject-matter of claim 4 in combination is new.

However, it is clear and obvious for a skilled person with the teaching of D4 that when the inattentive condition detecting means (S1) has determined that the driver is performing inattentive driving, a starting condition for the running support control is shifted to a promotion side, as compared to a case where the driver is not performing inattentive driving. This can be considered to be merely a slight variation of the disclosure of D4.

Hence no inventive step is present in the subject-matter of claim 4 in combination.

5 **Dependant claim 5:**

From D2 it is already known that the running support means performs adaptive cruise control (page 14, 2. paragraph) and collision shock reducing control (page 21, 2. paragraph).

Therefore, the subject-matter of claim 5 neither new nor inventive.

6 **Dependant claim 6:**

The subject-matter of claim 6 differs from D2 in that, when an obstacle, which has been detected by the first object detecting means (21), cannot be detected by the second object detecting means (22), and the inattentive condition detecting means (28) has determined that the driver is performing inattentive driving, a starting

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condition for the running support control performed by the running support means is shifted to a promotion side, as compared to a case where the driver is not performing inattentive driving and the same obstacle has been detected by both the first object detecting means (21) and the second object detecting means (22).

Therefore, the subject-matter of claim 6 is new.

The problem to be solved may be regarded as providing more appropriate control.

For solving above problem, the features of claim 6 are without example in the available prior art.

Therefore, the subject-matter of claim 6 involves an inventive step.

7 Dependant claims 8, 10, 11, 13:

What has been said about claim 6 applies mutatis mutandis to claims 8, 10, 11 and 13. Thus, the subject-matter of claims 8, 10, 11 and 13 is new and inventive.

8 Dependant claims 7, 9, 12, 14:

Since these claims contain additional features, the subject-matter of claims 7, 9, 12 and 14 is also new and inventive.

9 Independant claim 15:

A running support system according to claim 15 is already known from D5. Therefore, the subject-matter of claim 15 is neither new nor inventive.

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Re Item VII

Certain defects in the international application

- 1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 to D5 is not mentioned in the description, nor are these documents identified therein.

Claims

1. A running support system (2) for a vehicle (1),
5 which includes

first object detecting means (21) for detecting an object near a vehicle (1) using a radar;

second object detecting means (22) for detecting an object near the vehicle (1) by performing image
10 recognition based on an obtained image of an area near the vehicle (1); and

running support means for supporting running of the vehicle (1), characterized in that a control condition for running support control (S15; S57) performed by the
15 running support means is changed on the basis of an evaluation whether the same object has been detected by
(i) only the first object detecting means (21),
(ii) only the second object detecting means (22), or
(iii) both the first object detecting means (21) and
20 the second object detecting means (22).

25 [claims 2 to 15 remain unchanged]

~~CLAIMS.~~

1. A running support system (2) for a vehicle (1), which includes first object detecting means (21) for detecting an object near a vehicle (1) using a radar; second object detecting means (22) for detecting an object near the vehicle (1) by performing image recognition based on an obtained image of an area near the vehicle (1); and running support means for supporting running of the vehicle (1), characterized in that a control condition for running support control (S15; S57) performed by the running support means is changed based on a combination of results of detection of the same object performed by the first object detecting means (21) and the second object detecting means (22).
2. The running support system (2) for a vehicle (1) according to claim 1, wherein a starting condition for the running support control (S15; S57) performed by the running support means is shifted to a suppression side in a case where an object has been detected by only one of the first object detecting means (21) and the second object detecting means (22), as compared to a case where an object has been detected by both the first object detecting means (21) and the second object detecting means (22).
3. A running support system (2) for a vehicle (1) according to claim 1, further including inattentive condition detecting means (28) for detecting whether a driver is performing inattentive driving, wherein a control condition for running support control (S15; S57) performed by the running support means is changed also based on an inattentive condition of the driver detected by the inattentive condition detecting means (28).
4. The running support system (2) for a vehicle (1) according to claim 3, wherein, when the same obstacle has been detected by both the first object detecting means (21) and the second object detecting means (22), and the inattentive condition detecting means (28) has determined that the driver is performing inattentive driving, a starting condition for the running support control (S15; S57) performed by the running support means is shifted to a promotion side, as compared to a case where the driver is not performing inattentive driving.

5. The running support system (2) for a vehicle (1) according to claim 4, wherein the running support means performs at least one of follow-up running control, adaptive cruise control, obstacle alarm control, and collision shock reducing control.
6. The running support system (2) for a vehicle (1) according to claim 3, wherein, when an obstacle, which has been detected by the first object detecting means (21), cannot be detected by the second object detecting means (22), and the inattentive condition detecting means (28) has determined that the driver is performing inattentive driving, a starting condition for the running support control (S15; S57) performed by the running support means is shifted to a promotion side, as compared to a case where the driver is not performing inattentive driving and the same obstacle has been detected by both the first object detecting means (21) and the second object detecting means (22).
7. The running support system (2) for a vehicle (1) according to claim 6, wherein shifting of the starting condition of the running support control (S15; S57), which is performed by the running support means, to the promotion side is performed by making an amount of shift of a starting condition for running support control (S15; S57), in which there is less necessity for high accuracy in detection of an obstacle in the lateral direction, larger than an amount of shift of a starting condition for running support control (S15; S57), in which there is greater necessity for high accuracy in detection of an obstacle in the lateral direction.
8. The running support system (2) for a vehicle (1) according to claim 3, wherein, when an obstacle, which has been detected by the first object detecting means (21), cannot be detected by the second object detecting means (22), and the inattentive condition detecting means (28) has determined that the driver is not performing inattentive driving, from among starting conditions for various types of running support control (S15; S57) performed by the running support means, a starting condition for running support control (S15; S57), in which there is greater necessity for high accuracy in detection of an obstacle in the lateral direction, is shifted to a suppression side.
9. The running support system (2) for a vehicle (1) according to claim 7 or 8, wherein

the running support control (S15; S57), in which there is less necessity for high accuracy in the detection of an obstacle in the lateral direction, is one of follow-up running control and adaptive cruise control, and the running support control (S15; S57), in which there is greater necessity for high accuracy in the detection of an obstacle in the lateral direction, is one of obstacle alarm control and collision shock reducing control.

10. The running support system (2) for a vehicle (1) according to claim 3, wherein the running support means is one of a follow-up running control device and an adaptive cruise control device, and when an obstacle, which has been detected by the second object detecting means (22), has not been detected by the first object detecting means (21), one of prohibition and interruption of one of the follow-up running control and the adaptive cruise control is performed.
11. The running support system (2) for a vehicle (1) according to claim 3, wherein the running support means is a collision shock reducing control device (23, 24, 25, 26, 27), and when an obstacle, which has been detected by the second object detecting means (22), has not been detected by the first object detecting means (21), start time for collision shock reducing control (23, 24, 25, 26, 27) is retarded as compared to a normal state.
12. The running support system (2) for a vehicle (1) according to claim 11, wherein, when the inattentive condition detecting means (28) has determined that the driver is performing inattentive driving, the start time for the collision shock reducing control (23, 24, 25, 26, 27) is retarded by a smaller amount than that in a case where it has been determined that the driver is not performing inattentive driving.
13. The running support system (2) for a vehicle (1) according to claim 3, wherein the running support means is a collision shock reducing control device (23, 24, 25, 26, 27), and when an obstacle, which has been detected by the second object detecting means (22), has not been detected by the first object detecting means (21), contents of collision shock reducing control (23, 24, 25, 26, 27) are changed to those of control for a case where a shock due to a collision is small as compared to a normal state.

14. The running support system (2) for a vehicle (1) according to claim 13, wherein the collision shock reducing control (23, 24, 25, 26, 27) is performed by one of means for minimizing an amount of deformation of the vehicle (1), means for securing restraint of a passenger, and means for changing a damping force of suspension means.
15. A running support system (2) for a vehicle (1) which performs one of follow-up running control and adaptive cruise control, and obstacle alarm control, characterized in that notification of operation limit of one of the follow-up running control and the adaptive cruise control is made before an obstacle alarm is generated by the obstacle alarm control.